

AdriaClim

Progress in Activity 5.3 - Pilot Area FVG

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Meeting ARPA FVG | Palmanova | 30th September 2022

AdriaClim – Project structure

Work Packages

WP 0 - Project preparation

WP 1 - Project management and coordination of activities

WP 2 - Communication activities

WP 3 - Climate change monitoring (observing and modelling) systems

WP 4 - Information system and products

WP 5 - Adaptation Plans 

“Based on WP3 and WP4 outcomes, data, models and assessment and indicators on different aspects tackled, WP5 develops specific instruments and measures for the Pilot Sites, addressing local environmental and socio-economic priorities”

Why adapt?

Increasing RISK of climate change IMPACTS



Foto: ARPA FVG



Foto: PCR FVG

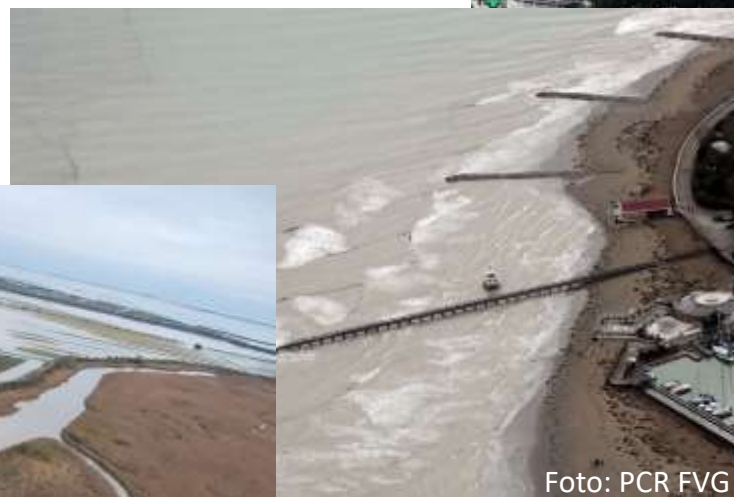


Foto: PCR FVG



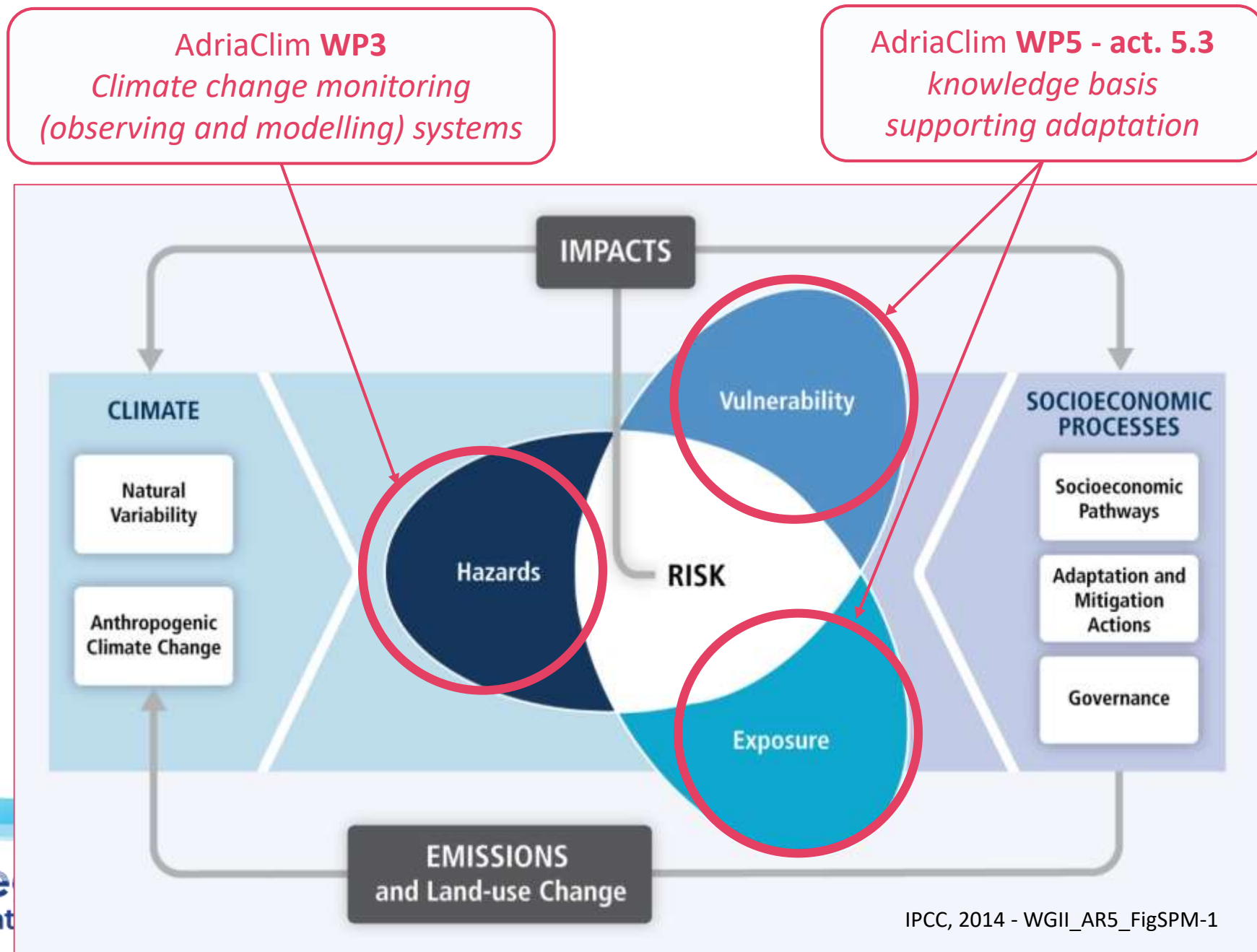
Fonte: Social Media Community

AdriaClim – Pilot FVG:
climate change impacts
related to SEA HAZARDS

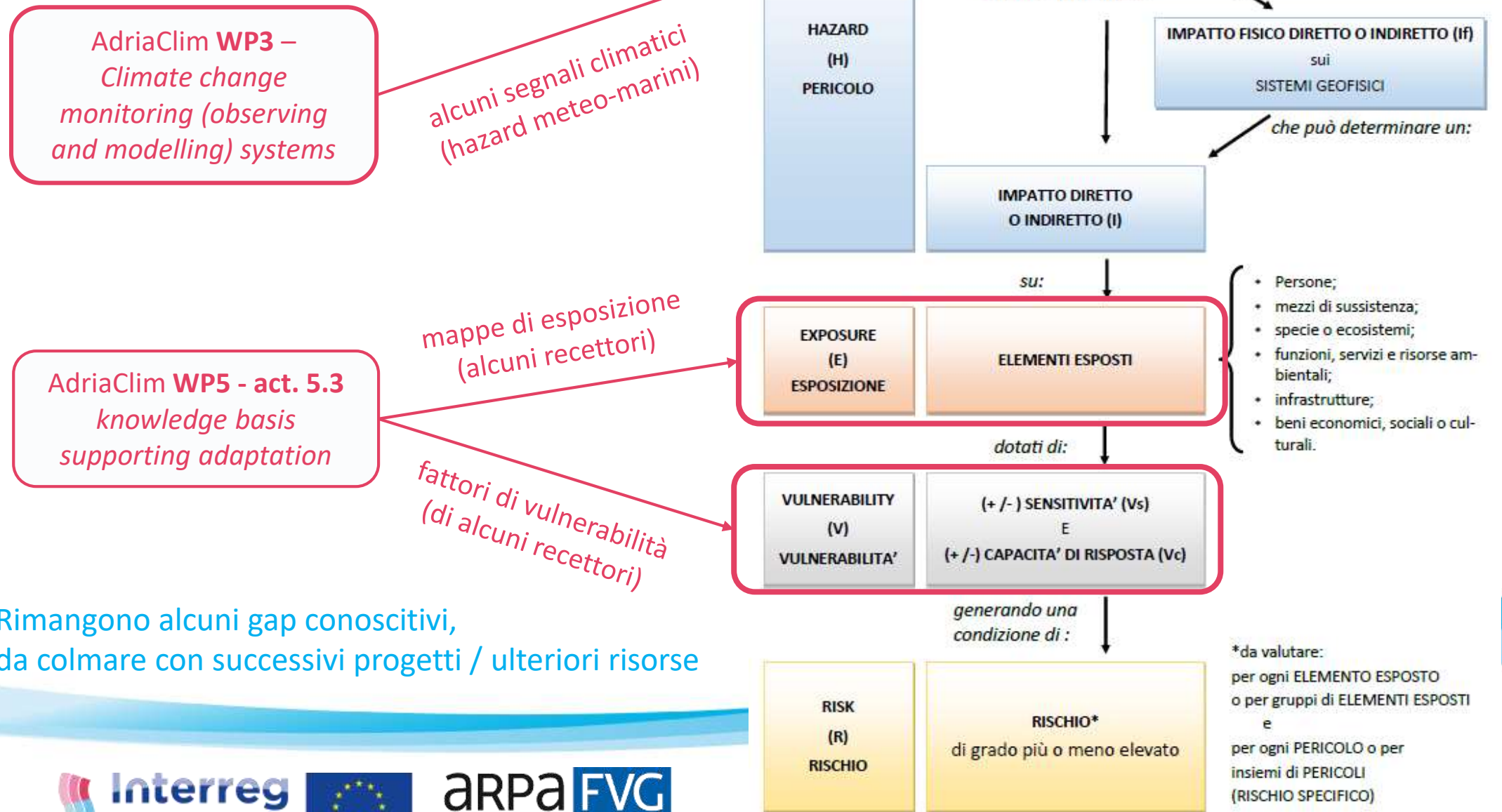
Adaptation

In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects. (IPCC – AR6, 2022)

Climate risk: conceptual framework



Climate risk: impact chains



AdriaClim **WP3** –
Climate change
monitoring (observing
and modelling) systems

alcuni segnali climatici
(hazard meteo-marini)

AdriaClim **WP5 - act. 5.3**
knowledge basis
supporting adaptation

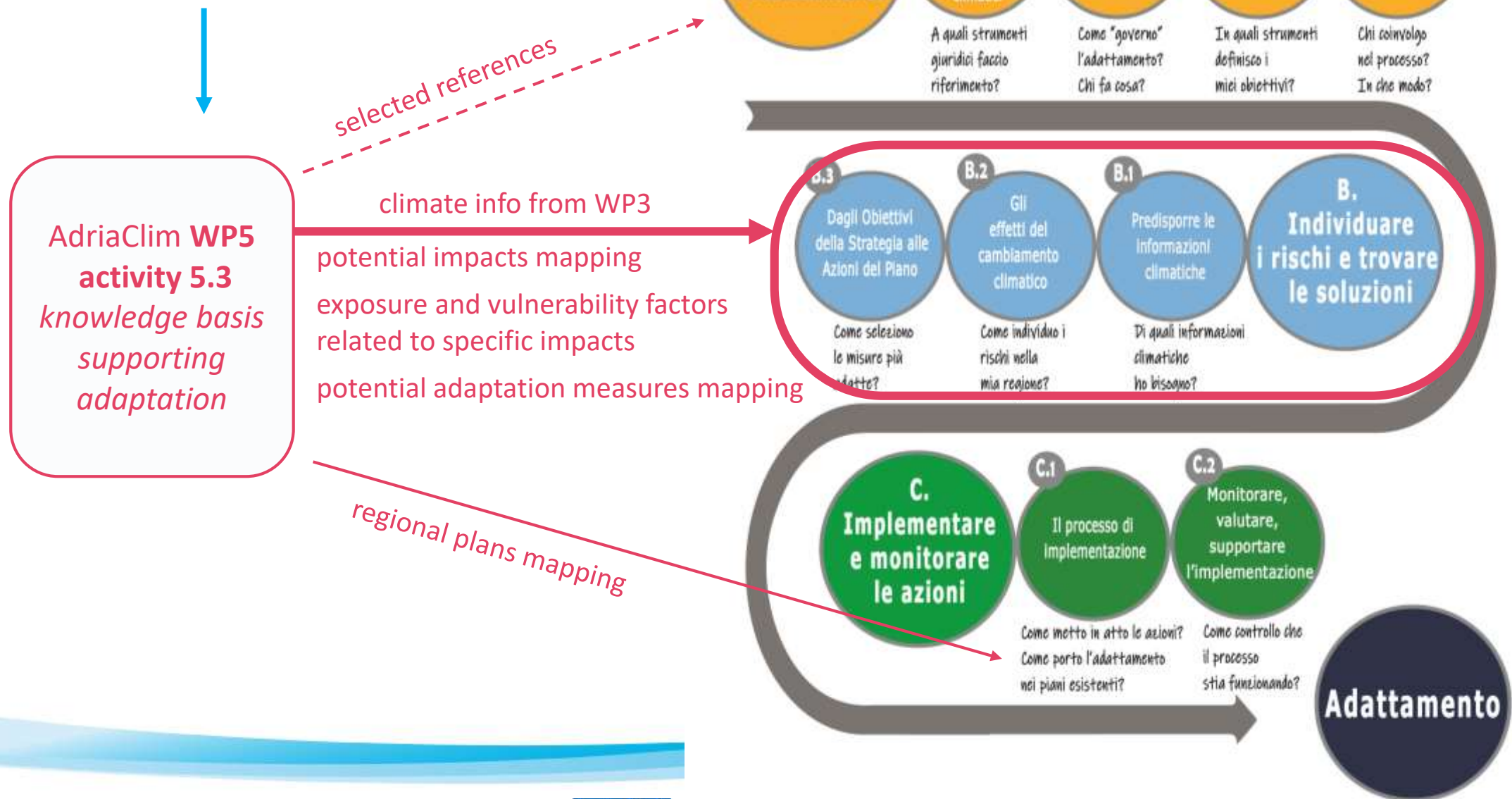
mappe di esposizione
(alcuni recettori)

fattori di vulnerabilità
(di alcuni recettori)

Rimangono alcuni gap conoscitivi,
da colmare con successivi progetti / ulteriori risorse

Adaptation roadmap

(CReIAMO PA methodology, 2020)



Modifications to project technical description, requested in the occasion of the Major Budget Change (June 2022)

Activity 5.3 FVG Pilot				Rationale behind changing the Activity
From	Adaptation/Mitigation/ Intervention Plan	To	Activities supporting adaptation plans in the FVG Pilot area <u>Two levels:</u> - a common knowledge basis for the pilot area - local relevant analysis and information about specific impacts <u>As a basis for:</u> - planning local adaptation actions and resilience solutions - promoting climate literacy among coastal communities	To ensure activity's consistency with recent developments concerning adaptation planning methodologies (national guidelines for regional and local administrations, issued in 2020 by the Italian Ministry of the Environment – CREIAMO PA project). To avoid overlapping with the FVG regional Strategy and Plan for mitigation and adaptation to climate change which are currently envisioned by a draft regional law (DDL "FVGreen")
Deliverables				Rationale behind changing the Deliverables
From	D 5.3.1 General adaptation Plan	To	D 5.3.1 - A general knowledge framework for local adaptation plans in FVG pilot area: - overview of existing spatial and sectoral plans - available information about climate hazards, impacts and tools for adaptation	To ensure consistency with the latest national guidelines on adaptation to climate change To facilitate mainstreaming and integration with forthcoming regional adaptation planning
From	D 5.3.2 Guidelines	To	D 5.3.2 - Insights from case studies for the development of local adaptation plans and actions: - examples - guidelines - summary cards from specific studies on local impacts	To integrate the results from case studies coordinated by ARPA FVG To satisfy local SHs' needs for clarity and comprehension of the complex interaction in climate change and impacts To stress the link between risk analysis and policy making for resilience
	D 5.3.3 Summary cards			
	D 5.3.4 Example of Local Adaptation Plan			

FVG pilot site identification

D 5.3.1

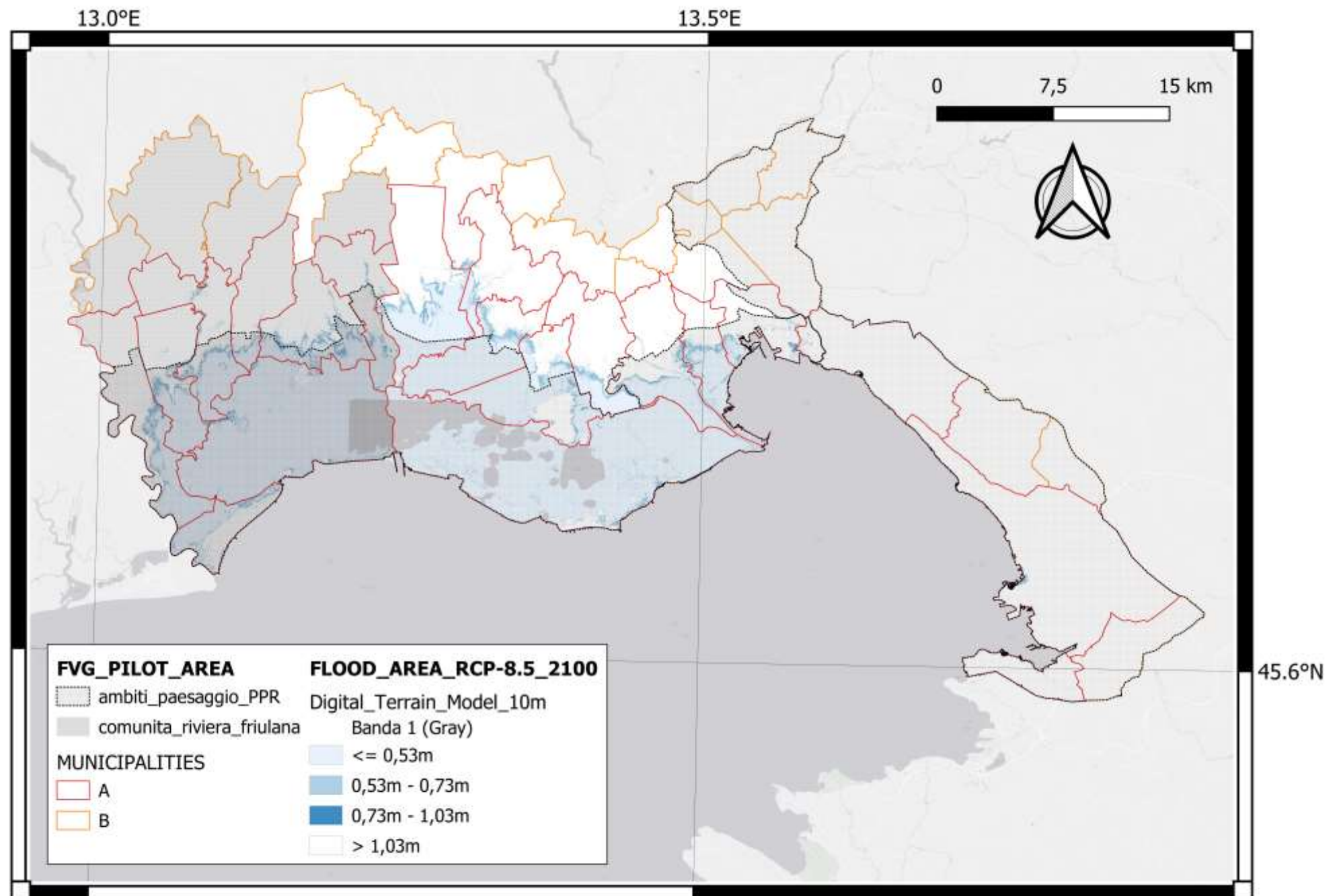
→ Area interested by Activity 5.3

FVG pilot site = FVG coastal and lagoon

→ **Municipalities** and **territories** that may be **involved in adaptation** planning in the face of one or more impacts on their territory

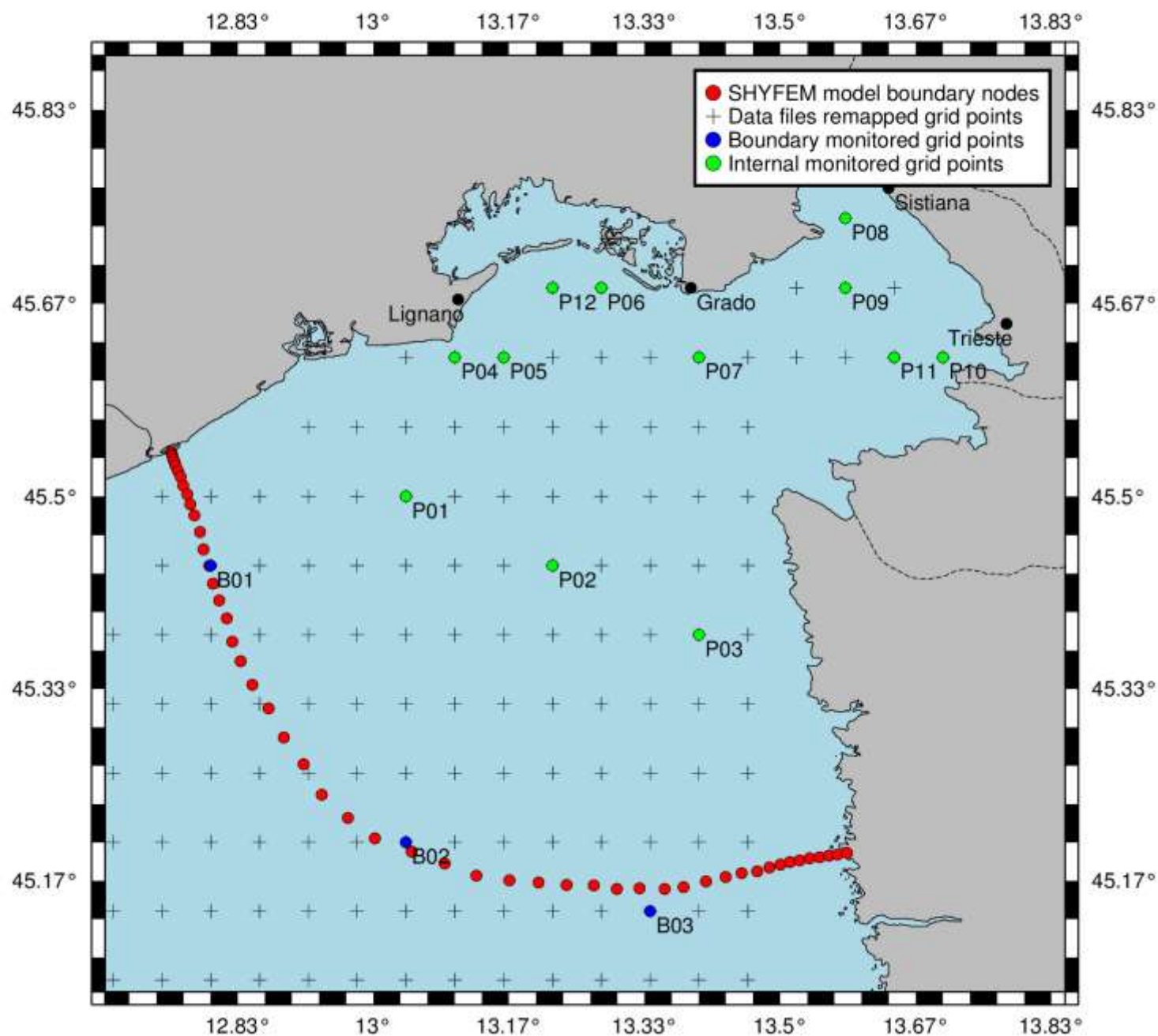
CRITERIA		
	Land	Sea
1	The most relevant, cross-sector and updated existing territorial planning tool: PPR (Regional Landscape Plan)	Calculation time required to perform simulations within a reasonable timeframe
2	The exposure to the most invasive sea-weather climate hazard: sea level rise	Sufficient coverage compared to the models' points grid
3		Distribution of competencies among partners to avoid overlapping with CNR-ISMAR area (Veneto)

FVG pilota area - LAND

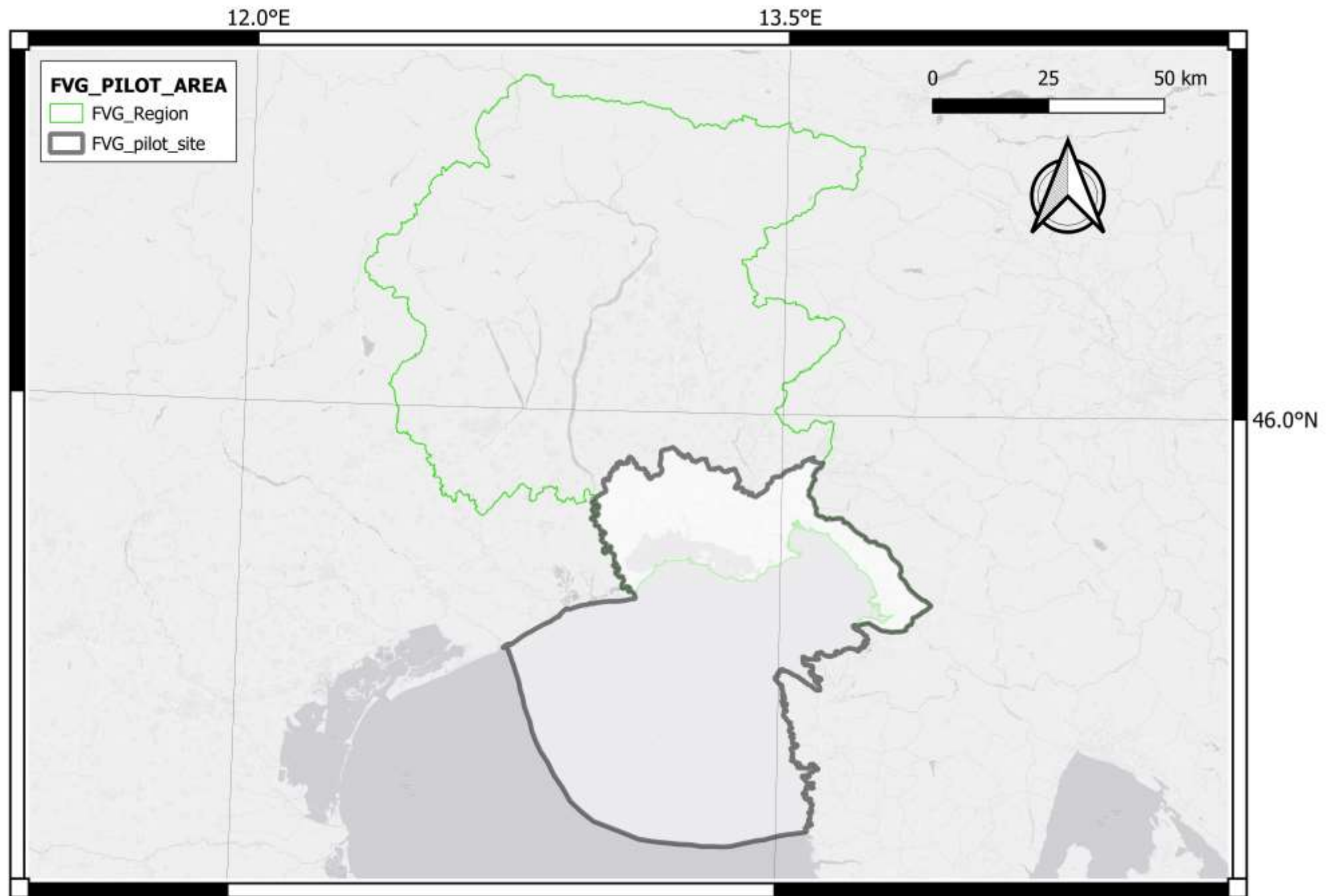


FVG pilota area - SEA

Analyzed geographical points



FVG pilota area - ENSEMBLE



FIRST STEP: Mapping

1) Regional Plans and Management Plans

2) Impacts and Hazards

- Knowledge basis for the incoming regional planning on adaptation/mitigation to CC
- General framework to which refer for case studies in D 5.3.2
- Consistency with CreiamoPA-L5 national guidelines «L5 Strengthening administrative capacity for adaptation to climate change»

D 5.3.1



Mapping:

1) Regional Plans and Management Plans

D 5.3.1

ID	A	B	C	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	
ID	Downloaded	Denominazione	Obiettivi/target specifici (Y/N)	Se sì, quali? (ref.)	Azioni/misure (Y/N)	Se sì, quali? (ref.)	Norme attuazione (Y/N)	Se sì, quali? (ref.)	Valutazione economica (Y/N)	Se sì, quali? (ref.)	Ref. clima (Y/N)	Se sì, fonte, pp., accenno/paragrafo	Ref. CC (Y/N)	Se sì, fonte, pp., accenno/paragrafo	Ref. impatti CC (Y/N)	Se sì, fonte, pp., accenno/paragrafo	Ref. ACC (Y/N)	Se sì, fonte, pp., accenno/paragrafo	Ref. MCC (Y/N)	Se sì, fonte, pp., accenno/paragrafo	Adattamento o mainstream	NOTE		
1	Y	Piano Paesaggistico Regionale del Friuli Venezia Giulia	Y	Obiettivi generali:	N	ND	Y	All. 5 Norme Tecniche di	N	ND	N	ND	Y	Accenno	N	ND	N	ND	N	ND	2	(1)	Il Piano ha lo	
2	Y	Piano del Governo del Territorio (PGT)	Y	Obiettivi per (1)	Y	(1) Politiche strategiche,	Y	All. 4 Norme tecniche di	N	ND	Y	Cenni [All. 1 Relazione di	Y	Cenni [All. 1 Relazione di	Y	Accenno indiretto	Y	Obiettivo 2.4, cap. 5.3	Y	Art. 19, comma 1,	10		Il PGT è lo st	
3	N	Piano Urbanistico Regionale Generale (PURG)																			0		Superato dal	
4	N	Piano di Bacino																			0		Il Piano di	
5	Y	Piano di Gestione delle Acque (PGA) 2021-2027	Y	Obiettivi della (OSI)	Y	(1) Vol. 6 Programma (M2) Prevenzione	Y	Vengono stabilite da	Y	Vol. 5 Analisi	Y	Accenno [Vol. 1	Y	Tutti i Volumi	Y	Tutti Volumi	Y	Appendice B - Analisi di	Y	10.4, 10.6- Vol. 5	10		Il Piano è rec	
6	Y	Piano di Gestione del Rischio Alluvioni 2021-2027 (PGRA)	Y	Riduzione	Y		Y	Vengono stabilite da	N	ND	Y	2.1.1- Caratteristiche	Y	2.2- Cambiament	Y	Cenni in 5.2- Principi e	Y	Cenni in 2.2- Cambiament	N	ND	10		Quel il PRGA	
7	N	Piano per l'Assetto Idrogeologico (PAI)																			0		Il Piano per l	
8	Y	Piano stralcio per l'assetto idrogeologico dei bacini del	N	Mancano degli	Y	Interventi strutturali e	Y	Allegato alla	Y	5.7-Costo complessivo	N	ND	N	ND	N	ND	N	ND	N	ND	0		Il Piano stral	
9	Y	Piano stralcio per l'assetto idrogeologico dei bacini di	N	Mancano degli	Y	Interventi strutturali e	Y	7-Norme di attuazione	Y	4.8.5- Metodologie	N	ND	N	ND	N	ND	N	ND	N	ND	0		Il PAI definì	
10	Y	Piano Regionale di Tutela delle Acque (PRTA)	Y	Cap. 1- Obiettivi di	Y	Capp. 2-5 degli	Y	4-Norme di attuazione	Y	5-Sintesi dell'analisi	Y	3.1- Caratteristiche	Y	3.1.2- Cambiament	Y	L'argomento CC, ACC e	Y	L'argomento CC, ACC e	Y	L'argomento CC, ACC e	10		Il Piano regl	
11	Y	Piano d'ambito di gestione integrata dei rifiuti urbani	Y	4.4- Obiettivi di	Y	4.5-Azioni di piano	Y	Cap. 6- Norme di	Y	3.6.7-Costi di	N	ND	Y	Argomento trasversale	Y	Cenni nel cap. 3-Stato	Y	Argomento trasversale	N	ND	9		Il precedente	
12	N	Piano d'ambito di gestione del servizio idrico integrato																			0		Il Piano dov	
13	Y	Strategia per la specializzazione intelligente	Y	4.1-Bisogni e	Y	4.3-Azioni a supporto	N	ND	N	ND	Y	1.1.1- Ambiente e	Y	1.1.1- Ambiente e	Y	1.8.4- Minacce	Y	1.8.3- Opportunità;	Y	1.8.3- Opportunità;	10		Strumento di	
14	Y	Piano Strategico 2018-2023	Y	8 linee strategiche	N	ND	N	ND	N	ND	N	ND	Y	Strategia 6- Mondo	Y	Strategia 6- Mondo	Y	Strategia 6- Mondo	N	ND	9		Il Piano stral	
15	Y	Piano Regionale di Prevenzione del Friuli	Y	6 Macro Obiettivi (p	Y	9 Programmi	N	ND	N	ND	N	ND	Y	3.9-PP09 Ambiente,	Y	Argomento trasversale	Y	Adattamento ai CC (da	Y	Cenni in 3.9.3.1-	9		(1) Redatto ai	

Mapping:

2) Impacts and Hazards

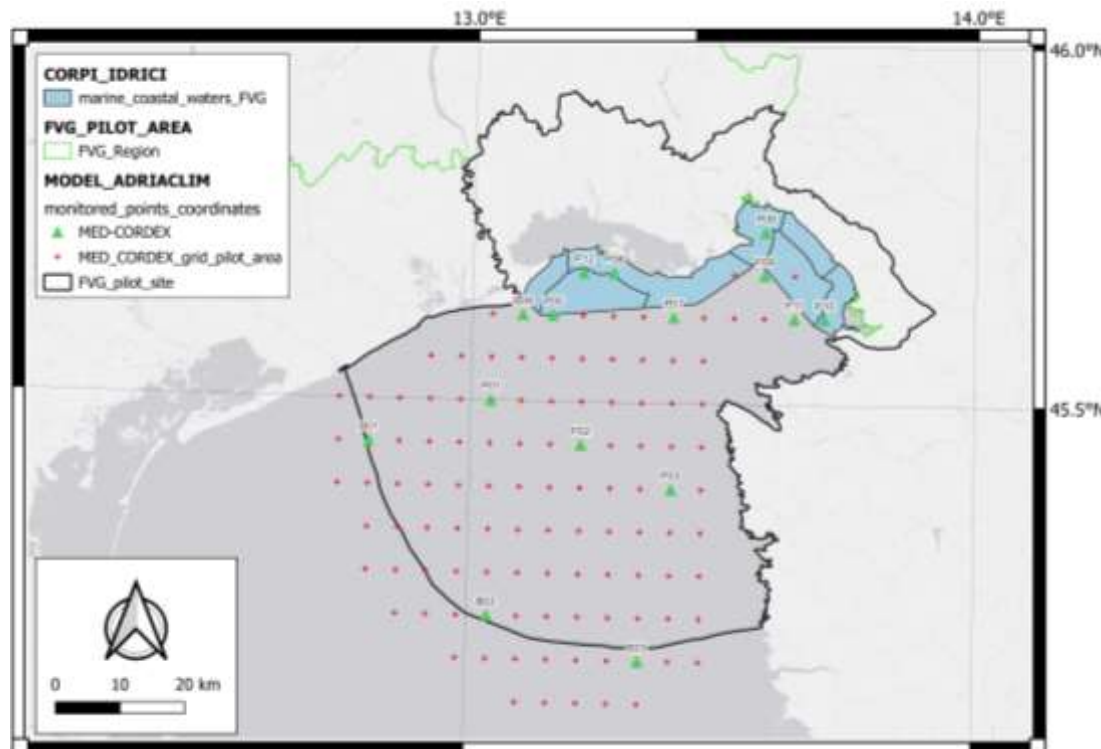
D 5.3.1

180 specific impacts

	A	B	C	H	I	J	K	L	M	N	O	P	Q	R
1	IT SNACC			HAZARD										
2	- Areas of													
3	Impacts													
		IMPACT 1.1	IMPACT 1.2	Heat and cold			Wet and dry					Wind		
				Air temperature variation	Increase in extreme heat events	Relative humidity variation (dip. da T aria)	Precipitation variation	Increase in heavy precipitation events (frequency and intensity)	Increase in river flood events	Increase in drought events	Increase in wildfire events	Mean wind speed variation	Incr sa win e	
5	Risorse idriche	MODIFICA DELLA DISPONIBILITÀ DELLE RISORSE IDRICHE RINNOVABILI (RI)	Diminuzione delle disponibilità idriche	Y	Increase summer mean T		Y	Decrease summer precipitation						
6		VARIAZIONE DI TERRITORIO SOTTOPOSTO A INUSUALI CONDIZIONI UMIDE O SECCHÉ (RI)	Aumento dei periodi di siccità	Y	Increase summer mean T		Y	Decrease summer precipitation						
7		Cambiamenti nella qualità delle acque		Y	Increase mean T									
8		VARIAZIONE DELLA DISPONIBILITÀ DI RISORSA IDRICA SOTTERRANEA (RI)	Cambiamenti di livello delle falde acquifere	Y	Increase mean T		Y	Decrease rain amount						
9		MODIFICHE DEL CICLO IDROLOGICO (RI)	Intensificazione del ciclo idrologico	Y	Increase mean T									
			Aumento degli eventi alluvionali (da fiumi, sistemi di drenaggio ecc.) (V. DISSESTO)											
10										Y				
11	grado del territorio e													
12														
13														

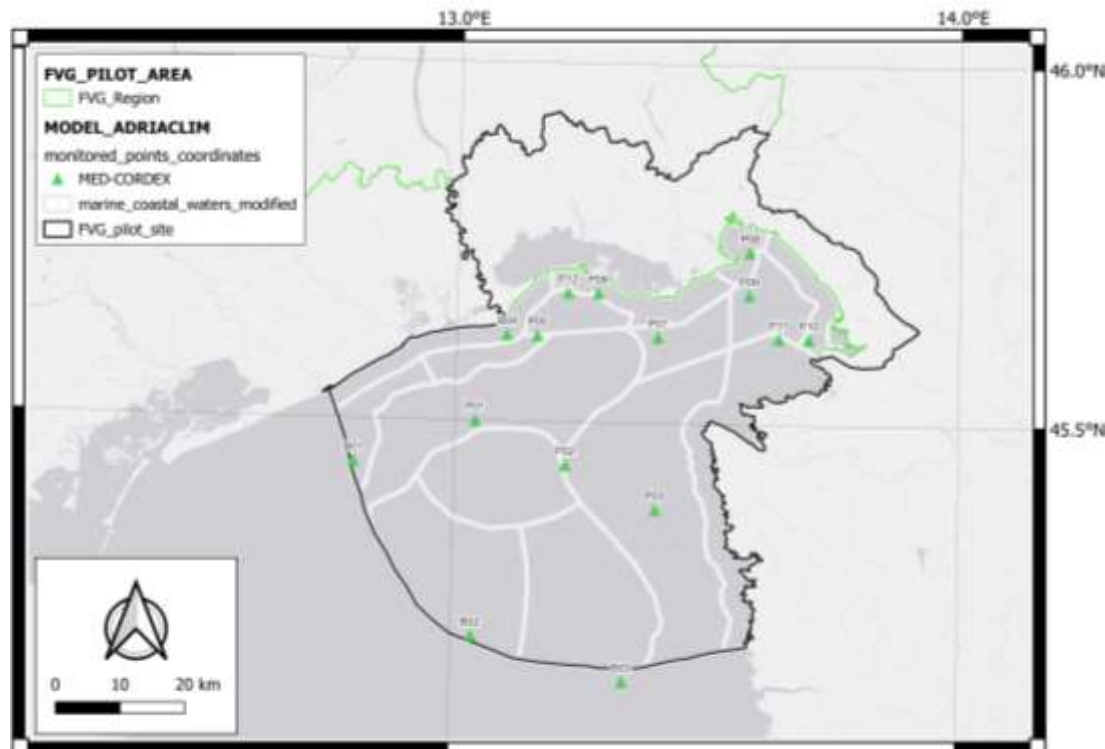


Hazard: Mean sea temperature variation



Starting points:

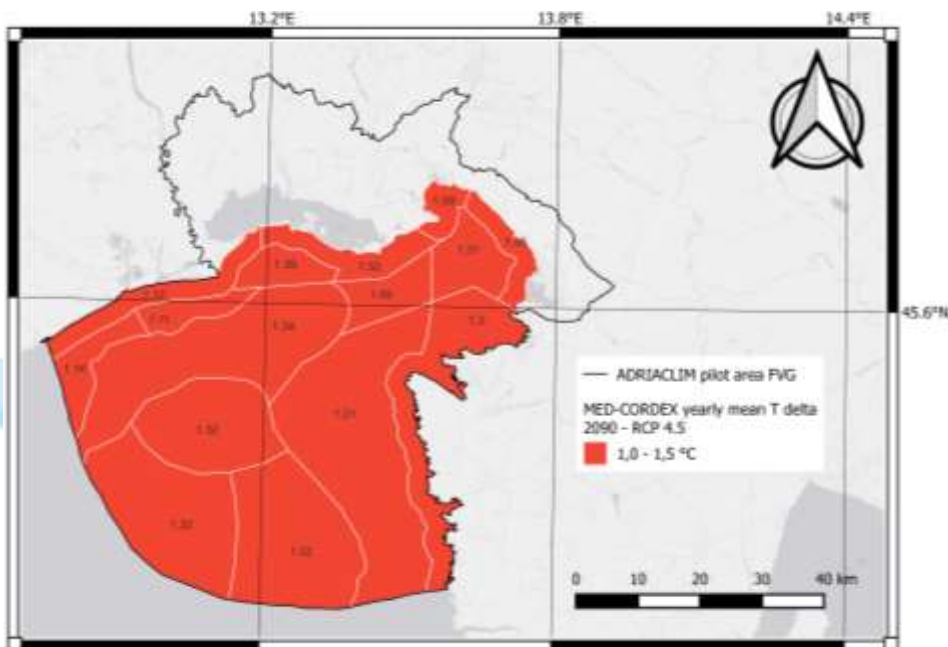
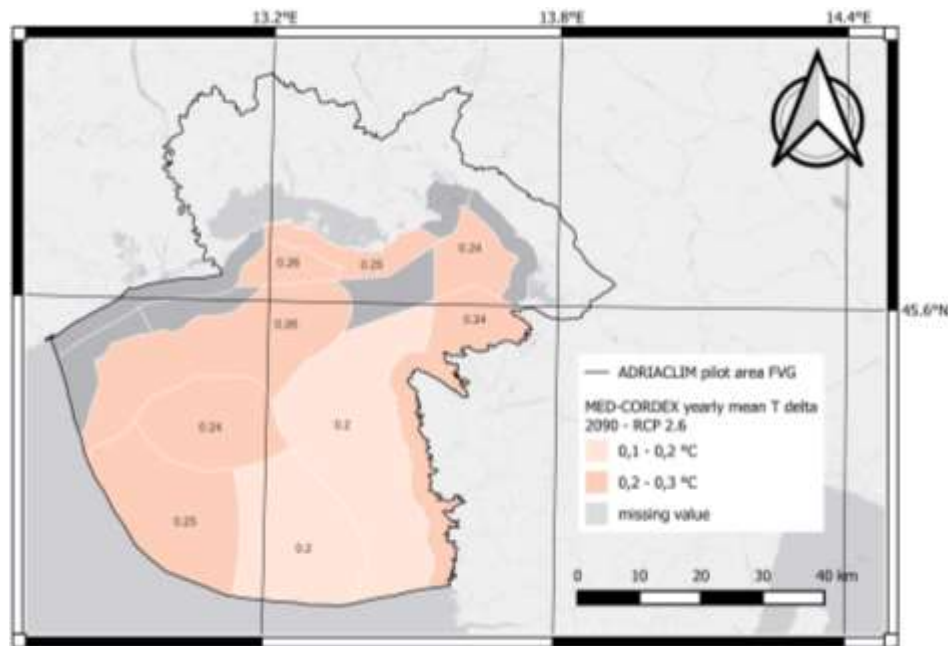
- Marine-coastal waters subdivision used by ARPA FVG in the monitoring of marine and transitional water quality
- Analyzed points from Med-Cordex data set



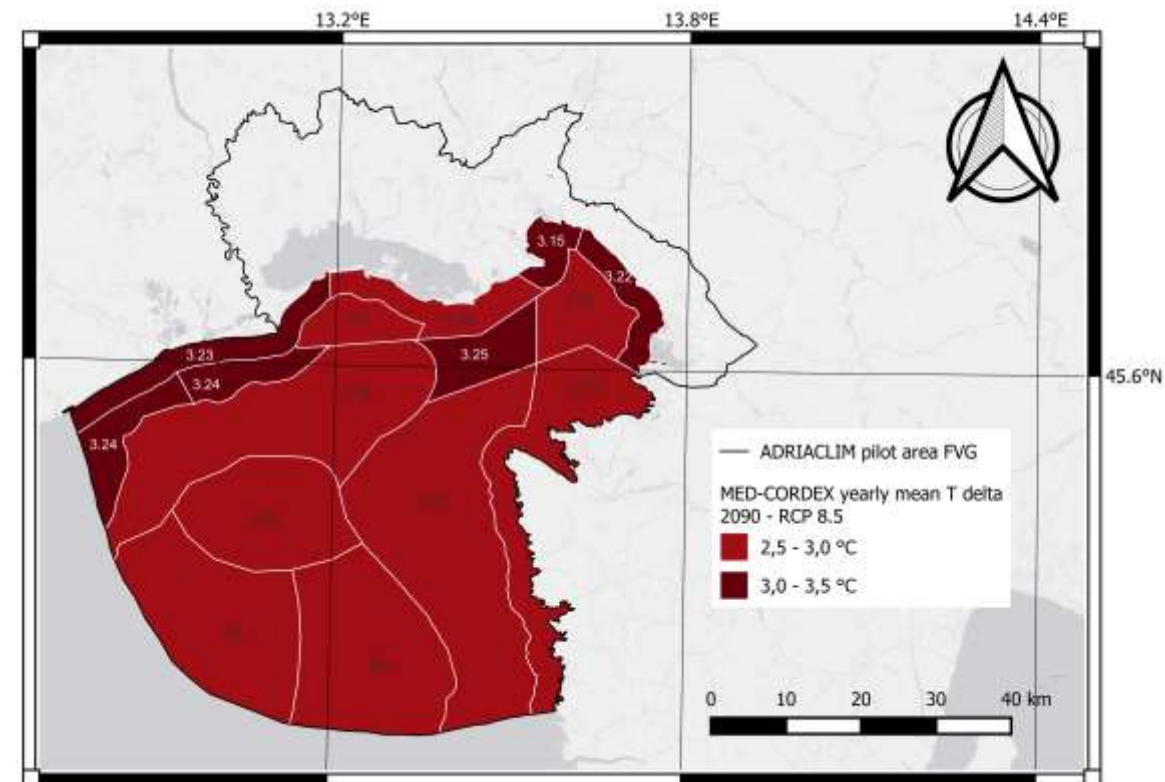
Second step:

- Additional information (i.e., bathymetry, river inputs and current direction) → to identify new pilot area's water bodies using the same methodology of ARPA FVG
- Pilot area subdivision in units homogeneous in terms of oceanographic characteristics, identified with the support of ARPA FVG marine biologists

Hazard: Mean sea temperature variation

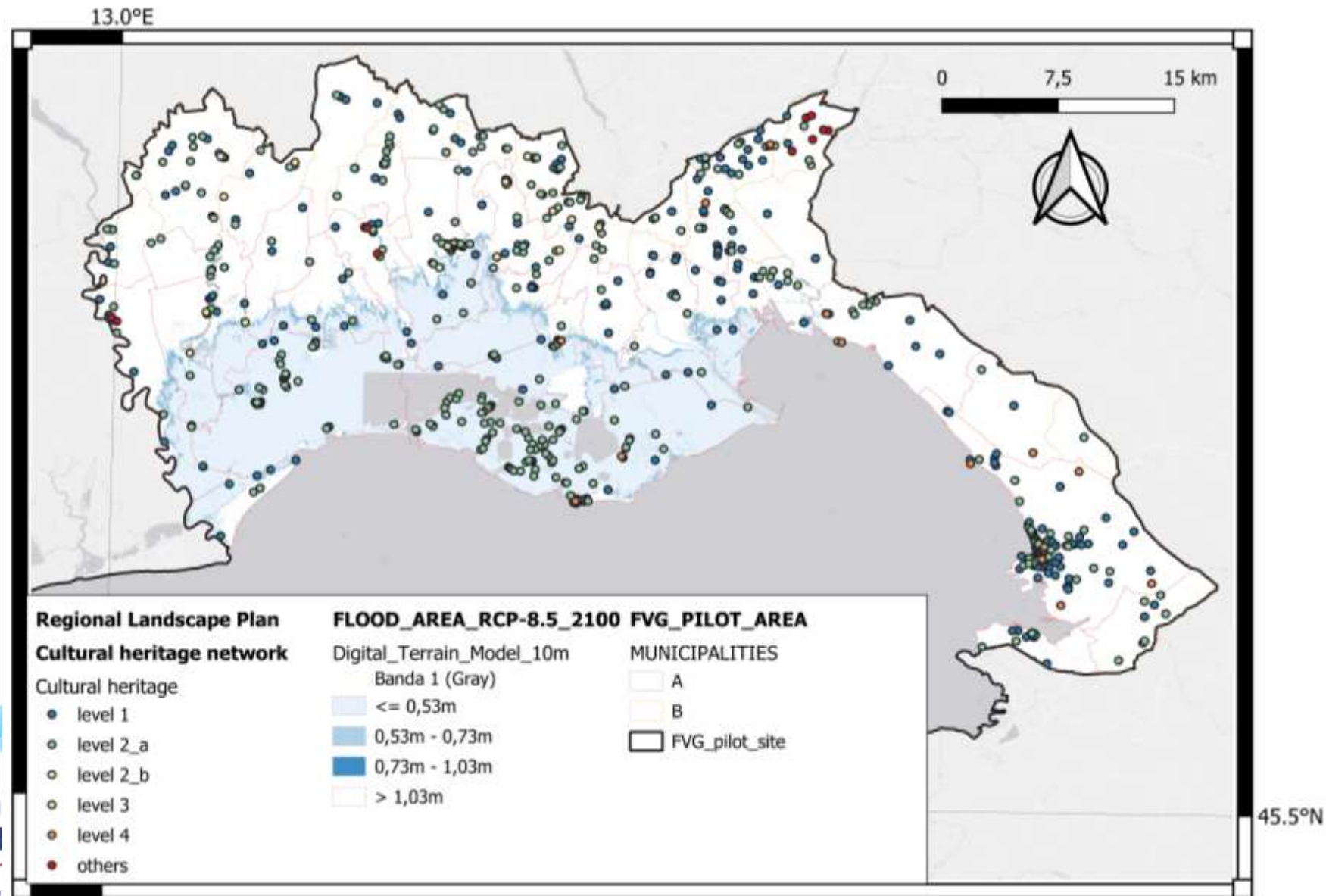


Maps of mean sea surface temperature variation at the end of the century under three different climate-altering gas emission scenarios (RCP2.6, 4.5, 8.5)



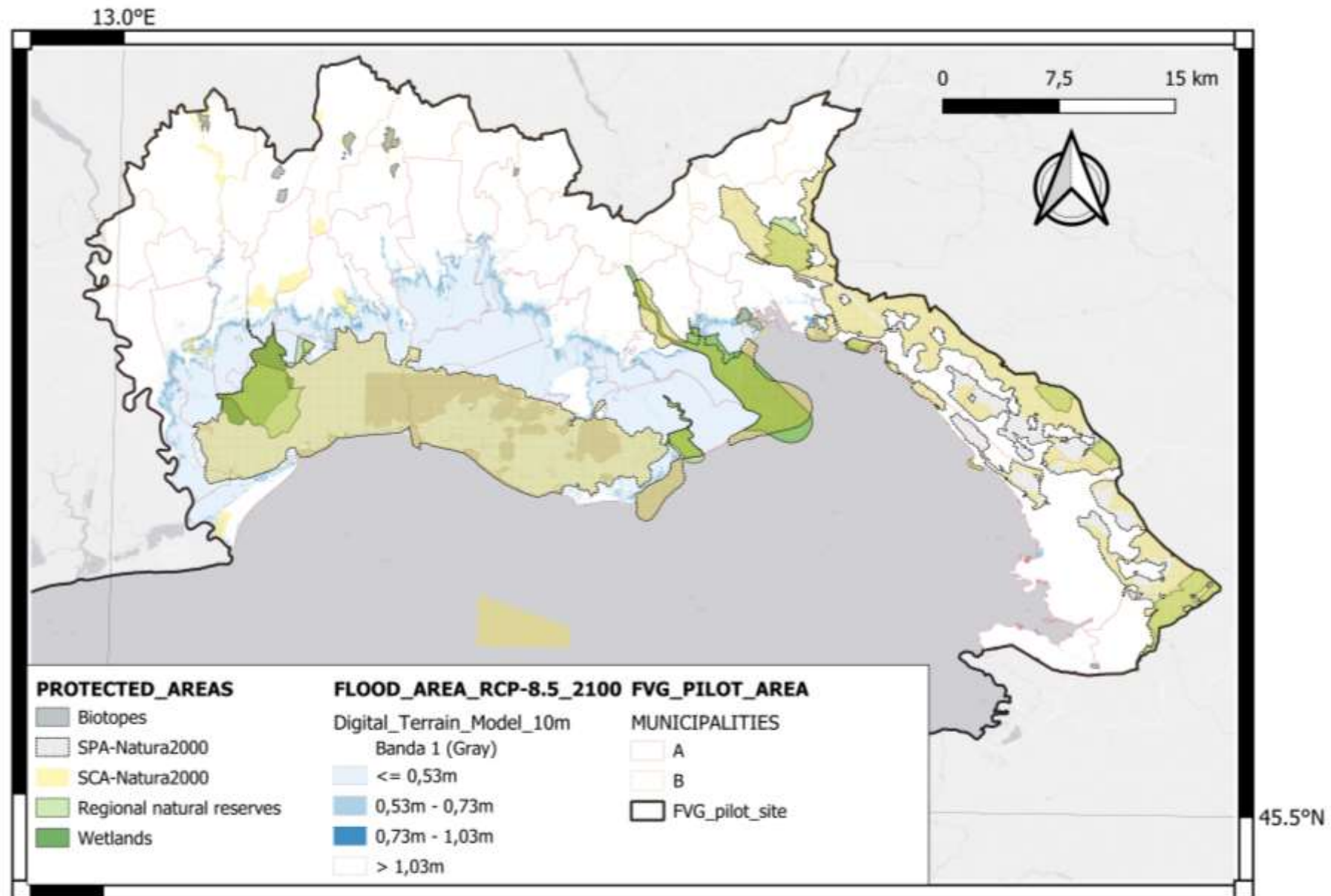
Hazard: Relative sea level rise

Exposure: sector Culturale Heritage > sites



Hazard: Relative sea level rise

Exposure: sector Ecosystems > protected areas



1) Lignano Sabbiadoro

Identikit

1° CASE STUDY

AREA	Lignano Sabbiadoro (UD)
SECTOR OF IMPACT*	Hydrogeological risk
IMPACT(S)	Beach erosion
HAZARD(S)	Increase in severe windstorm/sea storm events Increase in storm surges Relative sea level rise
OTHER INVOLVED SECTOR(S)	Tourism, Urban centers
SHs	Municipality of Lignano Università di Trieste-DMG-Coastal Group Lignano Sabbiadoro Gestioni SpA

1) Lignano Sabbiadoro

What's new

- Assessing erosion/growth trend:
 - 1) Shoreline comparison 2011-2020
 - 2) Shore orthophotos comparison 1998-2020
- Assessing shore slope
- Collecting information on future severe windstorm trends (Scirocco and Bora winds)
- Survey of exposure and vulnerability factors considered in previous studies

Involving stakeholders

- 20/06/2022 → Meeting with the Head of the Urban Planning - Private Construction Service of the Municipality of Lignano
- Summer 2022 → Digital material under developing (qGIS)
- Autumn 2022 → Preparing a meeting with technicians and experts (geologists from UNITS)

Case studies on specific impact(s)

1) Lignano Sabbiadoro

D 5.3.2

- Assessing erosion/growth trend: 1) Shoreline comparison 2011-2020

2011



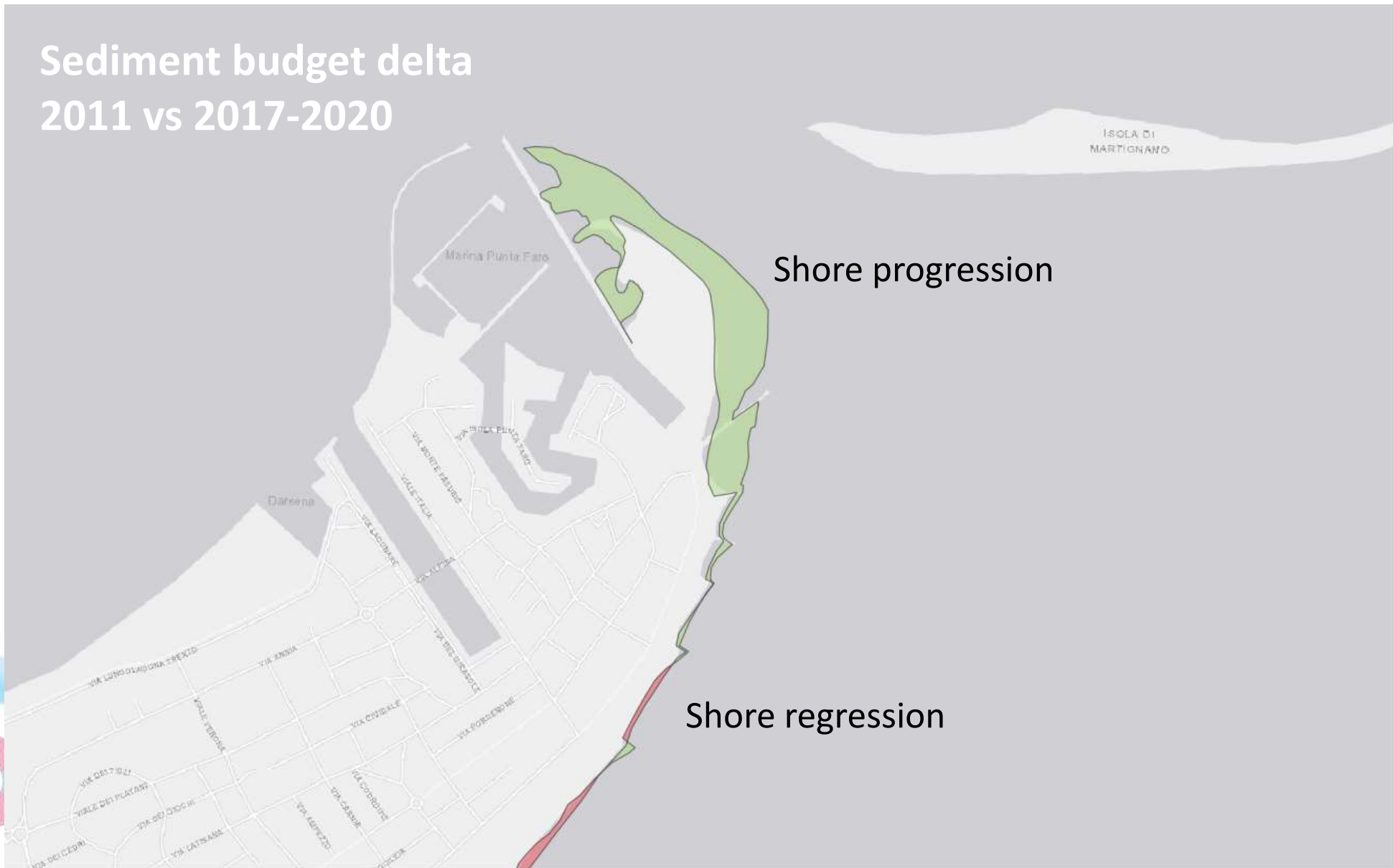
2017-2020



Case studies on specific impact(s)

1) Lignano Sabbiadoro

- Assessing erosion/growth trend: 1) Shoreline comparison 2011-2020

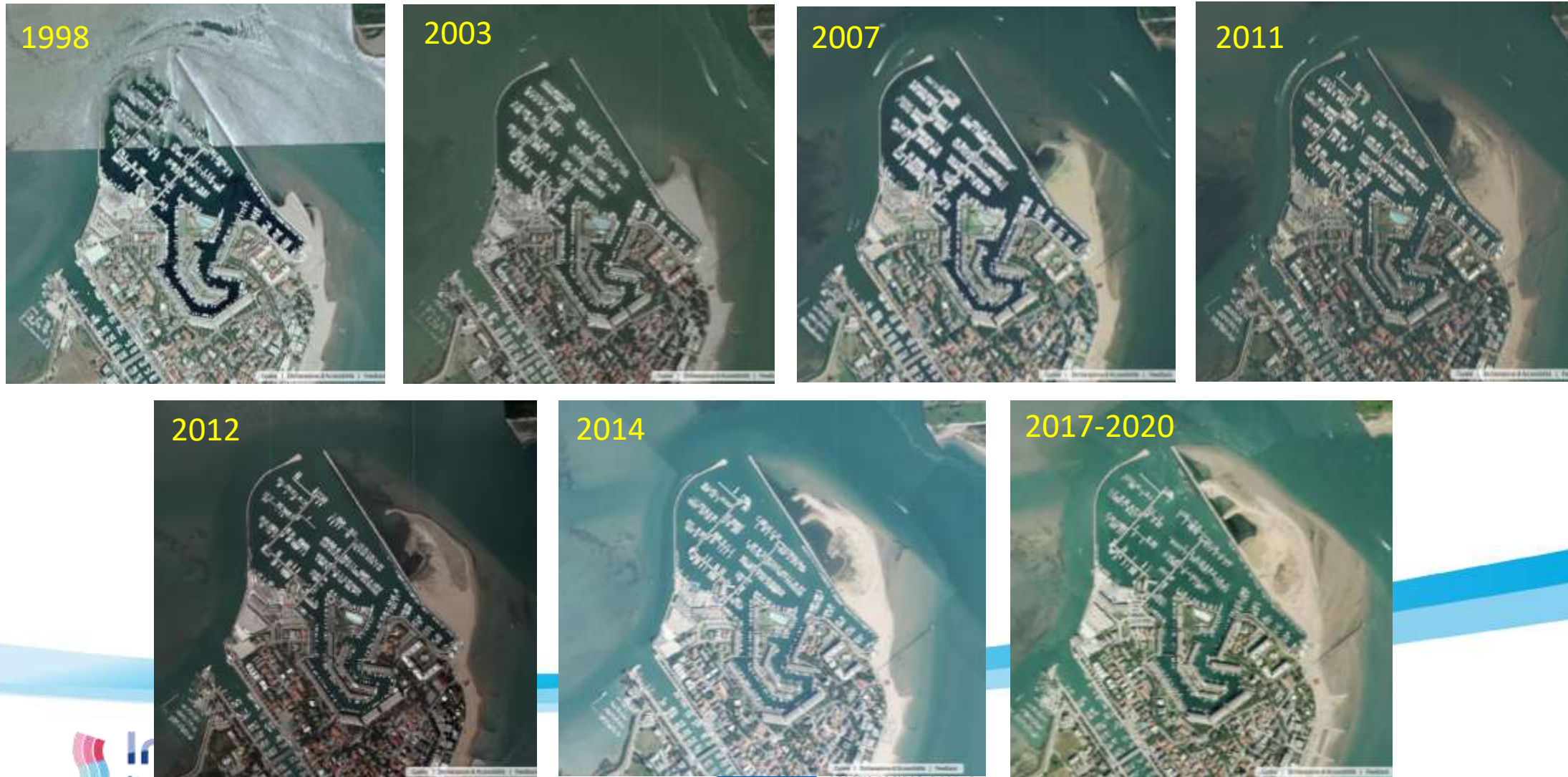


Case studies on specific impact(s)

D 5.3.2

1) Lignano Sabbiadoro

- Assessing erosion/growth trend: 1) Shore orthophotos comparison 1998-2020



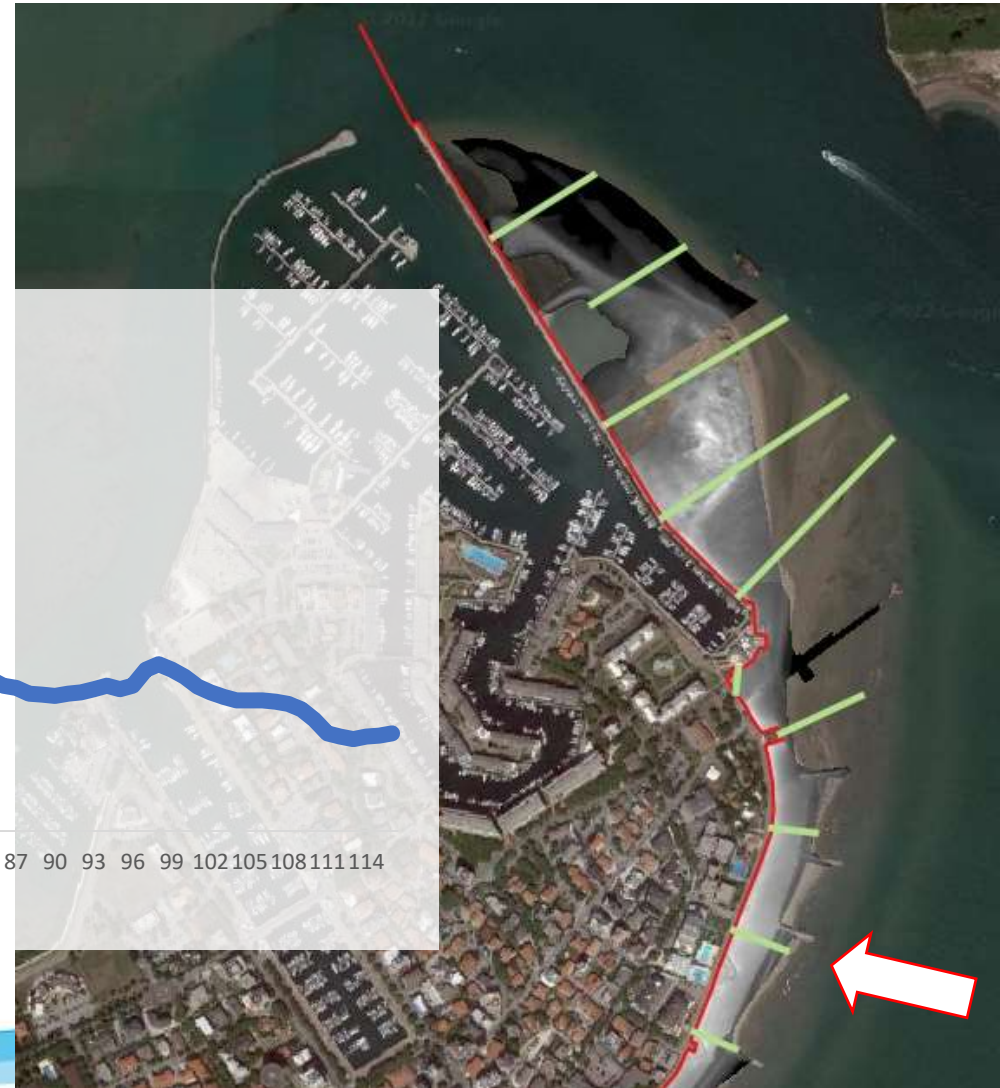
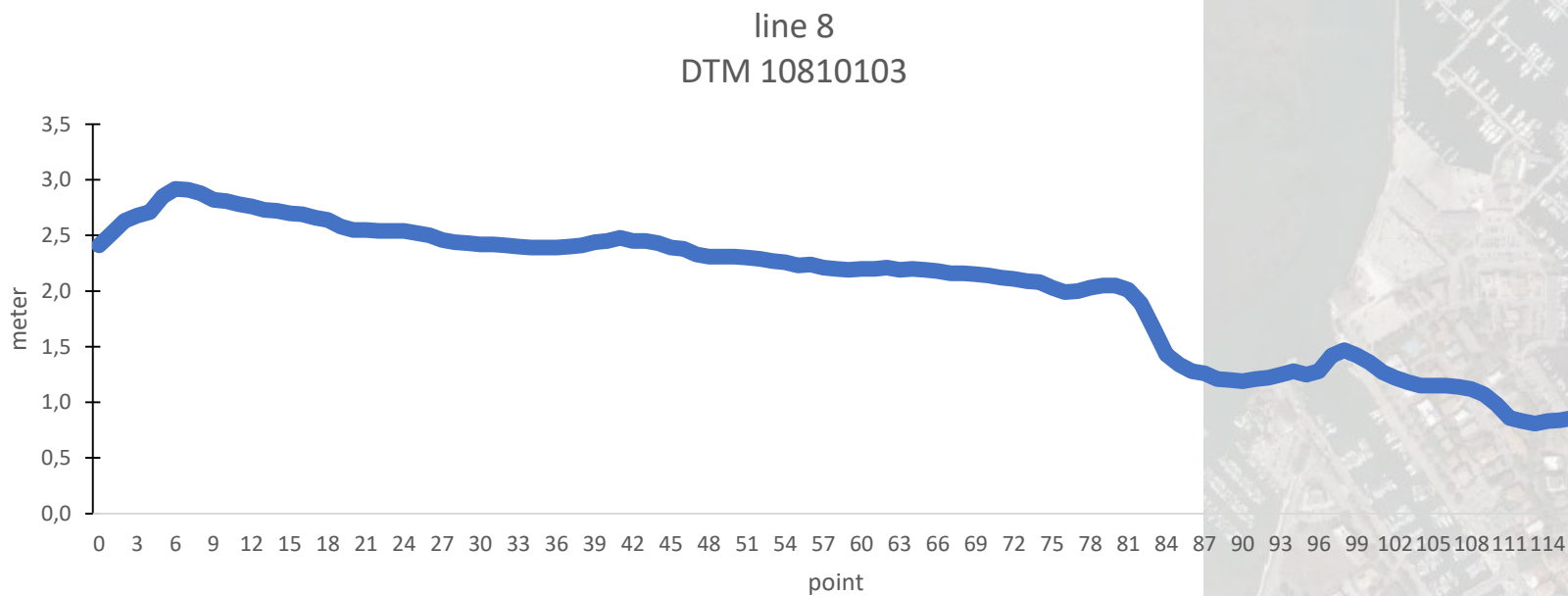
agenzia regionale per la
protezione dell'ambiente
del Friuli Venezia Giulia

Case studies on specific impact(s)

1) Lignano Sabbiadoro

D 5.3.2

- Assessing shore slope



2) Archeological area of Aquileia

Identikit

2° CASE STUDY

AREA	Archeological area of Aquileia
SECTOR OF IMPACT*	Cultural heritage
IMPACT(S)	Increase in damages by physical and atmospheric agents Submergence of archaeological sites and artistic heritage
HAZARD(S)	Air temperature variation Increase in extreme heat events Relative humidity variation Precipitation variation Increase in river flood events Increase in severe windstorm events Increase in storm surges Relative sea level rise
OTHER INVOLVED SECTOR(S)	Tourism, Urban centers
SHs	Municipality of Aquileia Fondazione Aquileia RAFVG-DC cultura e sport-Serv. Beni culturali e affari giuridici Industry professionals (archeologists)

Case studies on specific impact(s)

2) Archeological area of Aquileia

D 5.3.2

What's new

- Information on climate hazards (SLR)
- Digital cartography showing the position of the site in relation to the altitude value above sea level
- Identification of the relationship between climate hazard and damage (survey of specific existing knowledge/projects)

Involving stakeholder

- 29/06/2022 → Meeting with the Director Cultural Heritage and Legal Affairs Service of the FVG region
- Summer 2022 → Sending information material
- Autumn 2022 → Preparing a meeting with technician and industry professional

Case studies on specific impact(s)

2) Archeological area of Aquileia

D 5.3.2

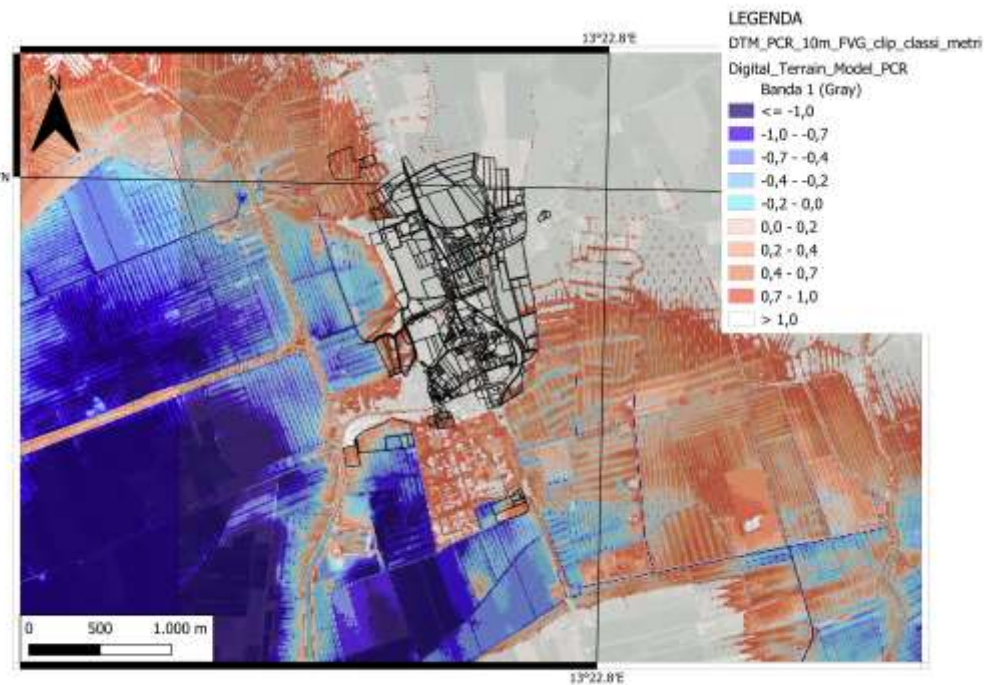


Table 2: Categorisation of damages to/effects on cultural heritage and their causes and related hazards

Damage to Cultural Heritage	Causes	Related hazard(s)
Physical/mechanical erosion and weathering of stone materials	Freeze / thaw cycles	Extreme temperatures
	Rain / hail impact	Extreme precipitation
	Abrasion	Severe wind
	Wave impact	Wave action; Storm surges
	Bio-plitting	Fungal action; Bacterial action
	Root-wedging	Vegetal action
	Tunnelling, carving	Animal action
	Weapons / objects impact	Armed conflicts; Wilful damage
	Landslides, mudslides, rock falls	Mass movement; Extreme precipitation; Extreme land use
Chemical erosion and weathering of stone materials	Wet / dry cycles	Extreme precipitation; Flooding (pluvial, fluvial or coastal)
	Salt intrusion	Flooding (coastal); Severe wind
	Inorganic and organic compounds, gases and particles	Pollution
	Lava flows and ashes	Volcanic activity

ARCH Saving Cultural Heritage

<https://savingculturalheritage.eu/>

Maltempo, allagata la Basilica di Aquileia

Sott'acqua anche i mosaici della Cripta degli scavi. Sul posto i volontari della Squadra Comunale di Protezione Civile che stanno lavorando senza sosta per limitare i danni



Other possible case studies

Sector: Ecosystems

Impacts on natural transitional and/or marine systems affecting biodiversity, ecosystem services and habitats loss

Sector: Aquaculture

Impacts on farmed species (mussels and fishes) such as changes in growth and survival, susceptibility to diseases and resistance to pests/toxic organisms and damages from extreme sea-weather phenomena

Hazards:

- Mean sea temperature variation
- Salinity variation
- Currents regime variation
- Relative sea level rise variation

What information are available?

For example, study on upwelling phenomena, information on hazards from WP3...

What experts can we involve?

For example, ARPA FVG marine biologists; RAFVG Servizio biodiversità; Università?

Next steps

Implementing collaboration with modellers and their work:

- WP3 results
- previous studies (for example on winds flux and trend)
- new available information such as results from the small-scale SHYFEM model

Involving stakeholders in autumn-winter 2022

- meeting with stakeholders and experts (archeologists) for the Aquileia archeological site, to identify impacts and related hazards and exposure/vulnerability factors
- meeting with experts (geologists) from UniTs to validate our qGIS digital cartography and survey methodology
- meeting with technicians of Lignano Municipality to share our work on beach erosion

Assessing and defining other possible case studies to be included in D 5.3.2

Thank you

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